

IN THE CLAIMS:

Please amend claims 16-19, 21-34, 36-46 and 48-49 as follows.

Please add new claims 50-51 as follows.

1. (Previously Presented) A method including:

determining a performance measure characterizing performance of a communication channel between a first transceiver and a second transceiver in a telecommunication system by using an extended channel model which depends on a non-orthogonal modulation matrix, the communication channel including non-orthogonal modulation by the non-orthogonal modulation matrix, wherein modulation symbols are distributed using at least two radiation patterns, the performance measure being sensitive to the modulation; and

controlling the communication resources based on the performance measure.

2. (Original) The method of claim 1, further including determining a plurality of performance measures for a plurality of communication channels between the first transceiver and the second transceiver; and

controlling the communication resources based on the performance measures.

3. (Original) The method of claim 1, further including determining a second performance measure for a second communication channel between the first transceiver and a third transceiver; and

controlling the communication resources based on the determined performance measures.

4. (Original) The method of claim 1, further including determining the performance measure by using a channel model which characterizes the communication channel between the first transceiver and the second transceiver.

Claim 5. (Cancelled)

6. (Previously Presented) The method of claim 1, wherein the modulation matrix includes at least one symbol which is transmitted using at least two antenna resources within at least two symbol time intervals.

7. (Previously Presented) The method of claim 1, wherein the modulation matrix includes at least one element in a group including: one row for forming a vector modulation, a plurality of rows for forming matrix modulation, a symbol rate greater than one, a row having a dimension greater than that of a channel matrix, a column having a

dimension greater than that of the channel matrix, effect of spreading, effect of carrier, effect of waveform, and effect of channelization codes.

8. (Original) The method of claim 1, further including determining the performance measure using at least one element in a group including: channel information on a radio channel associated with the communication channel, antenna weights associated with the communication channel, and modulation information on the communication channel.

9. (Original) The method of claim 1, wherein the performance measure comprises at least one element selected from a group including: frame-error rate, bit-error rate, signal-to-noise ratio, signal-to-interference ratio, asymptotic efficiency, throughput, interference power, and noise power.

10. (Original) The method of claim 1, further comprising selecting a transmission method based on the performance measure.

11. (Original) The method of claim 1, wherein controlling the communication resources is based on comparison between a target value and the performance measure.

12. (Original) The method of claim 1, further including adapting the communication resources to instantaneous requirements based on the performance measure.

13. (Previously Presented) The method of claim 1, wherein the communication channel further includes at least one element in a group including: interleaving, spreading, carrier waveform, sub-carrier waveform, channel encoding, matrix modulation, vector modulation, multiple-input multiple output modulation, space-time coding, space-frequency coding, space-code coding, beam forming, multi-beam forming, radio channel, channel decoding, detection, equalizing, RAKE reception, and filtering of a received signal.

14. (Original) The method of claim 1, wherein the communication resources include a transmit communication resource selected from a group including: a temporal transmit communication resource, a spectral transmit communication resource, an encoding resource, a spatial transmit communication resource, and transmit power.

15. (Original) The method of claim 1, wherein the communication resources include receive communication resources.

16. (Currently Amended) An apparatus comprising ~~arrangement including~~:

A determiner ~~determining unit~~ configured to determine a performance measure characterizing performance of a communication channel between a first transceiver and a second transceiver in a telecommunications system by using an extended channel model

which depends on a non-orthogonal modulation matrix, the communication channel including non-orthogonal modulation by the non-orthogonal modulation matrix, wherein modulation symbols are distributed using at least two radiation patterns, the performance measure being sensitive to the modulation; and

a controller ~~controlling-unit~~ configured to control the communication resources based on the performance measure.

17. (Currently Amended) The apparatus arrangement of claim 16, further including a ~~determining-unit~~ determiner configured to determine a plurality of performance measures for a plurality of communication channels between the first transceiver and the second transceiver; and

a controller ~~controlling-unit~~ configured to control the communication resources based on the performance measures.

18. (Currently Amended) The apparatus arrangement of claim 16, further including a ~~determining-unit~~ determiner configured to determine a second performance measure for a second communication channel between the first transceiver and a third transceiver; and

a controller ~~controlling-unit~~ configured to control the communication resources based on the determined performance measures.

19. (Currently Amended) The apparatus arrangement of claim 16, further including a ~~determining unit~~ determiner configured to determine the performance measure by using a channel model which characterizes the communication channel between the first transceiver and the second transceiver.

Claim 20. (Cancelled)

21. (Currently Amended) The apparatus arrangement of claim 16, wherein the modulation matrix includes at least one symbol which is transmitted using at least two antenna resources within at least two symbol time intervals.

22. (Currently Amended) The apparatus arrangement of claim 16, wherein the modulation matrix includes at least one element in a group including: one row for forming vector modulation, a plurality of rows for forming matrix modulation, a symbol rate greater than one, a row having a dimension greater than that of a channel matrix, a column with a dimension greater than that of a channel matrix, effect of spreading, effect of carrier, effect of waveform, and effect of channelization codes.

23. (Currently Amended) The apparatus arrangement of claim 16, wherein the ~~determining unit~~ determiner is configured to use at least one element in a group including: channel information on a radio channel associated with the communication

channel, antenna weights associated with the communication channel, and modulation information on the communication channel.

24. (Currently Amended) The apparatus arrangement of claim 16, wherein ~~determining-unit~~ determiner is configured to characterize at least one element selected from a group including: frame-error rate of the communication channel, bit-error rate, signal-to-noise ratio, signal-to-interference ratio, asymptotic efficiency, throughput, interference power, and noise power.

25. (Currently Amended) The apparatus arrangement of claim 16, further including a ~~selecting-unit~~ selector configured to select a transmission method based on the performance measure.

26. (Currently Amended) The apparatus arrangement of claim 16, wherein the ~~controlling-unit~~ controller is configured to control communication resources based on comparison of a target value and the performance measure.

27. (Currently Amended) The apparatus arrangement of claim 16, further including an ~~adapting-unit~~ adapter configured to adapt the communication resources to instantaneous requirements based on the performance measure.

28. (Currently Amended) The apparatus arrangement of claim 16, wherein the communication channel further includes at least one element in a group including: interleaving, spreading, carrier waveform, sub-carrier waveform, channel encoding, matrix modulation, vector modulation, multiple-input multiple output modulation, space-time coding, space-frequency coding, space-code coding, beam forming, multi-beam forming, radio channel, channel decoding, detection, equalizing, RAKE reception, and filtering of received signal.

29. (Currently Amended) The apparatus arrangement of claim 16, wherein the communication resources include a transmit communication resource selected from a group including: a temporal transmit communication resource, a spectral transmit communication resource, an encoding resource, a spatial transmit communication resource, and transmit power.

30. (Currently Amended) The apparatus arrangement of claim 16, wherein the communication resources include receive communication resources.

31. (Currently Amended) An apparatus comprising ~~controller of a telecommunications system, the controller including:~~

a performance measure estimator configured to determine a performance measure that characterizes performance of a communication channel between a first transceiver

and a second transceiver by using an extended channel model which depends on a non-orthogonal modulation matrix,

the communication channel including non-orthogonal modulation by the non-orthogonal modulation matrix,

wherein modulation symbols are distributed using at least two radiation patterns, and wherein the performance measure is sensitive to the modulation; and

a controller ~~control-unit~~ connected to the performance measure estimator ~~measurement-unit~~, the controller ~~control-unit~~ being configured to control the communication resources based on the performance measure.

32. (Currently Amended) The apparatus ~~controller~~ of claim 31, wherein the performance measure estimator is configured to determine a plurality of performance measures for a plurality of communication channels between the first transceiver and the second transceiver; and

wherein the controller ~~control-unit~~ is configured to control the communication resources based the performance measures.

33. (Currently Amended) The apparatus ~~controller~~ of claim 31, wherein the performance measure estimator is configured to determine a second performance measure for a second communication channel between the first transceiver and a third transceiver; and

wherein the controller ~~control unit~~ is configured to control the communication resources based on the determined performance measures.

34. (Currently Amended) The apparatus ~~controller~~ of claim 31, wherein the performance measure estimator is configured to determine the performance measure by using a channel model which characterizes the communication channel.

Claim 35. (Cancelled)

36. (Currently Amended) The apparatus ~~controller~~ of claim 31, wherein the modulation matrix includes at least one symbol which is transmitted using at least two antenna resources within at least two symbol time intervals.

37. (Currently Amended) The apparatus ~~controller~~ of claim 31, wherein the modulation matrix includes at least one element in a group including:

one row for forming a vector modulation, a plurality of rows for forming a matrix modulation, a symbol rate greater than one, a row having a dimension greater than that of a channel matrix, a column having a dimension greater than that of the channel matrix, effect of spreading, effect of carrier, effect of waveform, and effect of channelization codes.

38. (Currently Amended) The apparatus ~~controller~~ of claim 31, wherein the performance measure estimator is configured to determine the performance measure using at least one element in a group including:

channel information on a radio channel associated with the communication channel;

antenna weights associated with the communication channel; and

modulation information on the communication channel.

39. (Currently Amended) The apparatus ~~controller~~ of claim 31, wherein the performance measure is configured to characterize at least one element selected from a group including: frame-error rate of the communication channel, bit-error rate, signal-to-noise ratio, and signal-to-interference ratio.

40. (Currently Amended) The apparatus ~~controller~~ of claim 31, wherein the controller ~~control-unit~~ is configured to select a transmission method based on the performance measure.

41. (Currently Amended) The apparatus ~~controller~~ of claim 31, wherein the controller ~~control-unit~~ is configured to control communication resources based on comparison between a target value and the performance measure.

42. (Currently Amended) The apparatus controller of claim 31, wherein the controller ~~control unit~~ is configured to adapt the communication resources to instantaneous requirements based on the performance measure.

43. (Currently Amended) The apparatus controller of claim 31, wherein the communication channel further includes at least one element in a group including: interleaving, spreading, carrier waveform, sub-carrier waveform, channel encoding, matrix modulation, vector modulation, multiple-input multiple output modulation, space-time coding, space-frequency coding, space-code coding, beam forming, multi-beam forming, radio channel, channel decoding, detection, equalizing, RAKE reception, and filtering of a received signal.

44. (Currently Amended) The apparatus controller of claim 31, wherein the communication resources include a transmit communication resource selected from a group including: a temporal transmit communication resource, a spectral transmit communication resource, an encoding resource, a spatial transmit communication resource, and transmit power.

45. (Currently Amended) The apparatus controller of claim 31, wherein the communication resources include receive communication resources.

46. (Currently Amended) An apparatus comprising arrangement including:

means for determining a performance measure characterizing performance of a communication channel between a first transceiver and a second transceiver by using an extended channel model which depends on a non-orthogonal modulation matrix, the communication channel including non-orthogonal modulation by the non-orthogonal modulation matrix, wherein modulation symbols are distributed using at least two radiation patterns, the performance measure being sensitive to the modulation; and

means for controlling the communication resources based on the performance measure.

47. (Previously Presented) The method of claim 1, further comprising determining the performance measure by using a receive filter matrix which depends on a non-orthogonal matrix via the extended channel model.

48. (Currently Amended) The apparatus arrangement of claim 16, wherein the ~~determining unit~~ determiner is configured to determine the performance measure by using a receive filter matrix which depends on a non-orthogonal matrix via the extended channel model.

49. (Currently Amended) The apparatus ~~controller~~ of claim 31, wherein the performance measure estimator is configured to determine the performance measure by using a receive filter matrix which depends on a non-orthogonal matrix via the extended channel model.

50. (New) An apparatus, comprising:

a performance measure estimator configured to determine a performance measure that characterizes performance of a communication channel between a base station and a mobile station by using an extended channel model which depends on a non-orthogonal modulation matrix, the communication channel including non-orthogonal modulation by the non-orthogonal modulation matrix, wherein modulation symbols are distributed using at least two radiation patterns and wherein the performance measure is sensitive to the modulation; and

a radio frequency part configured to transmit the determined performance measure to the base station for controlling communication resources.

51. (New) An apparatus, comprising a controller configured to receive a performance measure that characterizes performance of a communication channel between a first transceiver and a second transceiver by using an extended channel model which depends on a non-orthogonal modulation matrix, the communication channel including non-orthogonal modulation by the non-orthogonal modulation matrix, wherein modulation

symbols are distributed using at least two radiation patterns and wherein the performance measure is sensitive to the modulation, and to control; communication resources based on the received performance measure.